

REMARKS

Status of Claims

Claims 1-16 are pending and have been rejected. Claims 1 and 6-16 have been amended to correct informalities in the claim language and to more clearly define the claimed subject matter. Support of the amendments to Claim 1 may be found, for example, on page 15, lines 10-25 or on page 6, lines 16-18 in the Specification. Support of the amendments to Claim 12 may be found, for example, on page 16, lines 6-9 in the Specification. In addition, Claim 5 have been cancelled, and new claim 17 has been added.

Rejections under 35 U.S.C. §101

In the outstanding Office Action dated March 12, 2007, the Examiner has rejected Claims 1-16 under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. More specifically, the Examiner asserts that Claims 1 and 12 are directed towards non-statutory subject matter because they fail to recite specific steps for the production and output of a “useful, tangible, and concrete result” of the processed picture by using the claimed method and apparatus as there is no specific generated output communicated externally from the steps of the method or the elements of the apparatus. Applicants respectfully traverse this rejection for the following reasons.

Independent Claim 1, as amended, a method claim comprising, in its pertinent part, producing coded data in the third step. Applicants respectfully submit that the “coded data” is a “useful, tangible, and concrete result” of the processed image by using the claimed method and “producing coded data” is a specific step for the production and output of a “useful, tangible, and concrete result.” Thus, Applicants respectfully submit that the rejection of Claim 1 under 35

U.S.C. §101 should be withdrawn. Similarly, the rejections of Claims 2-11 dependent from Claim 1 should be withdrawn.

Independent Claim 12 is an apparatus for coding a moving picture. An apparatus falls under the “machine” class of 35 U.S.C. § 101. Thus, Applicants respectfully submit that the apparatus of Claim 12 is directed to statutory subject matter. Similarly, dependent Claims 13-16 are also directed to statutory subject matter.

In addition, Claim 12, as amended, recites, in its pertinent part, a coding block for ... “producing coded data.” Applicants respectfully submit that the “coded data” is a “useful, tangible, and concrete result” of the processed image by using the claimed apparatus and a coding block for ... “producing coded data” is a specific element for the production and output of a “useful, tangible, and concrete result.” Thus, Applicants respectfully submit that the rejection of Claim 12 under 35 U.S.C. §101 should be withdrawn. Similarly, the rejections of Claims 13-16 dependent from Claim 12 should be withdrawn.

Rejections under 35 U.S.C. §112, second paragraph

The Examiner has rejected Claims 1-16 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. More specifically, the language “the same frequency transform ...” in Claim 1 is vague and indefinite because it based on the claim construction it can be construed that the said “same frequency transform ...” is actually the orthogonal transform mentioned in the third coding step, since a DCT transform is also a frequency transform and can also be manipulated to produce size reduced images, and opposed to establishing that the same frequency transform

limitation is actually a commonly applied wavelet transform for first and second searches.

Applicants respectfully traverse this rejection for the following reasons.

Claim 1 has been amended to incorporate the limitations in Claim 5. Claim 1, as amended, now recites in the pertinent part that the first step includes performing, ... “wavelet transform” to both of the current image and the reference image. Applicants respectfully submit that Claim 1 clearly defines that wavelet transform applies to the first and second searches, and thus the rejection of Claim 1 should be withdrawn. Similarly, the rejections of Claims 2-11 dependent from Claim 1 should be withdrawn.

With regard to independent Claim 12, the Examiner does not specifically mention the reason that Claim 12 is rejected under 35 U.S.C. §112, second paragraph. Even assuming the section B) on page 3 of the Office Action refers to Claim 12, Claim 12 does not recite “the *same frequency transform...*” Thus, the rejection of Claim 12 should be withdrawn.

Applicants, however, have amended Claim 12 to more clearly define the claimed subject matter. Claim 12, as amended, now recites in the pertinent part that the motion detection block includes a first “wavelet transform” section for performing a first wavelet transform to the current image and a second “wavelet transform” section for performing a second wavelet transform to the reference image. Applicants respectfully submit that Claim 12 clearly defines that wavelet transform applies to the first and second searches. Thus, the rejection of Claim 12 should be withdrawn. Similarly, the rejections of Claims 13-16 dependent from Claim 12 should be withdrawn.

Rejections under 35 U.S.C. §103(a)

Claims 1-16 have been rejected under 35 U.S.C. §103(a), as being unpatentable over Lempel (USP 5,796,434) in view of Zhang (USP 5,477,272). Applicants respectfully traverse this rejection for the following reasons.

With regard to Claim 1, the Examiner asserts that Lempel discloses an image coding method for coding a moving picture, comprising: a first step of detecting a motion vector for a current image to be coded using a reference image; a second step of performing motion compensation to the reference image using the motion vector; and a third step of coding, using orthogonal transformation, quantization and variable-length coding, a difference between the current image and the motion-compensated reference image, wherein the first step includes: performing matching between the current image and the reference image to perform a first search, and the use of a frequency transform for performing a first search as in the claim 1. But, the examiner admits that Lempel fails to disclose determining if no motion vector is detected in the first search, using substantially the same frequency transform (wavelet transform) for both of the current image and the reference image and then matching between size reduced images generated by the frequency transform (wavelet transform) to each other to perform a second search, as is recited by claim 1. The Examiner relies on Zhang asserting that Zhang discloses the use of a wavelet based multi-resolution motion estimation method using substantially the same frequency transform for both of the current image and the reference image and then matching between size-reduced images generated by the frequency transform to each other to perform a second search as an improvement over DCT based motion estimation in that it allows for search area expansion without the increase in computations.

However, Applicants respectfully submit that neither Lempel nor Zhang teach or suggest that the wavelet transform to both of the current image and the reference image is performed **only when no motion vector is detected in the first search**. More specifically, according to the invention of Claim 1, as amended, ***only*** when no motion vector is detected in matching between a current image and a reference image, is wavelet transform performed and then matching is performed between size-reduced images after wavelet transform to search a motion vector. Thus, the number of wavelet transforms in the motion vector detection can be suppressed to a minimum since the wavelet transform is performed only if needed. In other words, whether matching between size-reduced images after wavelet transform is needed or not is determined based on determining whether a motion vector is detected in matching between the current image and the reference image. In addition, neither Lempel nor Zhang teach or suggest the limitation of determining whether a motion vector is detected in the first search.

In contrast, Zhang discloses a technique where, in motion detection, frequency transform is performed to generate a size-reduced image and then a correction is made based on a motion vector obtained by using the size-reduced image to obtain a final motion vector. Zhang fails to teach or suggest that the method includes determining whether a motion vector is detected in matching between the current image and the reference image and only when no motion vector is detected, performing matching between size-reduced images generated by wavelet transform. In addition, Lempel also fails to teach or suggest such elements.

In order to establish prima facie obviousness under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. *In re Rokya*, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974). At a minimum, the cited prior art does not disclose (expressly or inherently) the above recited limitations. Therefore, Applicants respectfully request that the rejection of Claim 1

under 35 U.S.C. § 103(a) be withdrawn. In addition, it is respectfully submitted that Claims 2-11, dependent from Claim 1, are also allowable.

With regard to Claim 12, the Examiner asserts that Lempel discloses an image coding apparatus for coding a moving picture, comprising: a detection block for detecting a motion vector for a current image to be coded using a reference image; a motion compensation section for performing motion compensation to the reference image using the motion vector detected by the motion detection block; and a coding block for coding, using orthogonal transformation, quantization and variable-length coding, a difference between the current image and the motion-compensated reference image, wherein the motion detection block includes: a first frequency transform section for performing a first frequency transform to the current image to generate a first size-reduced image. The Examiner admits that Lempel fails to disclose using a second frequency transform (wavelet transform) for performing a second frequency transform which is substantially the same as the first frequency transform (wavelet transform) to the reference image to generate a second size-reduced image, and the motion detection block is so configured to be able to detect a motion vector for the first size-reduced image by referring to the second size-reduced image. The Examiner relies on Zhang asserting that Zhang discloses the use of a wavelet based multi-resolution motion estimation apparatus including means for using a second frequency transform which is substantially the same as the first frequency transform to the reference image to generate a second size-reduced image, and that the motion detection block is so configured to be able to detect a motion vector for the first size-reduced image by referring to the second size-reduced image as an improvement over DCT based motion estimation in that it allows for search area expansion without the increase in computations.

However, Applicants respectfully submit that neither Lempel nor Zhang teach or suggest

that the apparatus comprises, in the pertinent part, a microcomputer for determining whether motion vector detection using size-reduced images is needed. In other words, according to Claim 12, as amended, a microcomputer for determining whether motion vector detection using size-reduced images is needed is provided. In contrast, neither Zhang nor Lempel teach or suggest any elements corresponding to the microcomputer as recited in Claim 12. Nothing in Zhang or Lempel teach or suggest the element that determines whether a motion vector is detected in matching between the current image and the reference image for determining whether matching between size-reduced images after wavelet transform is needed or not.

In order to establish prima facie obviousness under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. *In re Rokay*, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974). At a minimum, the cited prior art does not disclose (expressly or inherently) the above recited limitations. Therefore, Applicants respectfully request that the rejection of Claim 12 under 35 U.S.C. § 103(a) be withdrawn. In addition, it is respectfully submitted that Claims 13-16, dependent from Claim 12, are also allowable.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there

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are any outstanding issues that might be resolved by an interview or an Examiner's amendment,
the Examiner is requested to call Applicant's attorney at the telephone number shown below.

Respectfully submitted,

MCDERMOTT, WILL & EMERY



Michael E. Fogarty
Registration No. 36,139

600 13th Street, N.W.
Washington, DC 20005-3096
(202) 756-8000 MEF:TS:rp
Facsimile: (202) 756-8087
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